

Attorney Docket #10010872-1

Remarks/Arguments

Claims 12-17 and 21-22 remain in this application. Claims 1-11 and 18-20 have been canceled. Claim 12 has been amended.

A. Examiner's Remarks

A restriction between claims 1-11 (Group I) and claims 12-22 (Group II) was required under 35 U.S.C. §121.

Claims 12-22 were rejected under 35 U.S.C. §120(e) as being anticipated by Hanaoka et al (US 2002/0030245). Claims 18-20 were rejected since they were directed to a product per se.

Claim 12 was rejected under 35 U.S.C. §102(b) as being anticipated by Youmans (USPN 3,761,782).

B. Election/Restrictions

A restriction between claims 1-11 (Group I) and claims 12-22 (Group II) was required under 35 U.S.C. §121. In a telephone conversation between the Examiner and Mr. Wu on 12/06/02, a provisional election was made without traverse to prosecute the claims in the Group II invention. Applicants hereby affirm this election. Claims 1-11 have been canceled from this application.

C. Claim rejections - 35 U.S.C. §102(e): Claims 12-22

Claims 12-22 were rejected under 35 U.S.C. §120(e) as being anticipated by Hanaoka et al (US 2002/0030245). Claims 18-20 were rejected since they were directed to a product per se.

Hanaoka teaches a via in which the middle portion of the via is wider than either end of the via. (Figs 1, 7A-16) Hanaoka teaches that "the diameter of the middle part of the through hole is made larger as much as possible" so that the hole can be more easily

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plated. (page 7, second sentence of paragraph 148). Hanaoka also suggests that this shape for a via does not compromise the strength of the surrounding semiconductor chip as other shapes (page 7, seventh sentence of paragraph 148).

In distinct contrast to Hanaoka, the present invention teaches a via that increases in width, growing from a minimum width at one end to a maximum width at the other. This allows the via to be more easily coated with metal. The present invention specifically teaches against the shape in Hanaoka, because the narrow ends of the via make it harder to coat the via with metal. Furthermore, the prior art specifically teaches against the shape of the present invention, since Hanaoka implies that other shapes compromise the strength of the chip.

Claim 12 has been amended to reflect this unique feature. Claims 13-17 and 21-22 have also been amended, but only to refer to the new terminology used in amended claim 12. Independent claim 12, and dependent claims 13-17 and 21-22, are believed to be allowable over Hanaoka. Claims 18-20 have been canceled.

No new matter has been introduced with this amendment. The rejections to claims 12-22 are believed to be overcome.

D. Claim rejections - 35 U.S.C. §102(b)

Claim 12 was rejected under 35 U.S.C. §102(b) as being anticipated by Youmans (USPN 3,761,782).

Youmans teaches a via built in a semiconductor body that is doped with an impurity, such as P-type or N-type. (Column 2, lines 34-38). Due to these impurities, the semiconductor is actually conductive. Youmans teaches that it is necessary that impurities be present in the semiconductor body, because diffusion posts having the same impurities are formed and connected to the body to create isolation barriers for the devices. (column 4, lines 2-17). Therefore, the via hole in the semiconductor must be lined with an insulating layer of silicon dioxide before it is coated with metal, in order to keep the via from shorting out the rest of the devices on the semiconductor wafer. (Column 3, lines 40-46). The insulating layer 18 of silicon dioxide is shown in every figure of the completed via (Figs 5-11).

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In distinct contrast to Youmans, the present invention uses semiconductor that is very high resistivity (page 5, paragraph 19), and therefore no insulating layer is required between the conductive metal and the semiconductor body when forming the via. The conductive metal can be directly applied to the walls of the through hole. This unique feature is seen in amended claim 12, which claims "a wafer of resistive semiconductor material" and "a metal layer that adheres to the inner walls of the through hole".

Independent claim 12 is believed to be allowable over the prior art.

No new matter has been introduced with this amendment. The rejection to claim 12 is believed to be overcome.

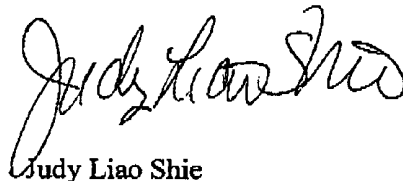
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C nclusion

If there are any further questions or if more discussion is required, the Examiner is invited to call the Applicants' agent at the telephone number given below. In view of the above, the claims presently in the application are believed to be distinct over the prior art and in condition for allowance. Accordingly, it is respectfully requested that such allowance be granted at an early date.

Respectfully submitted,

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